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SOUTHCOM Distribution Analysis

MORS 2007

19 October 2007

Greg Grindey and Jean Mahan
USTRANSCOM J5/4-AS

SOUTHCOM Theater Distribution Plan

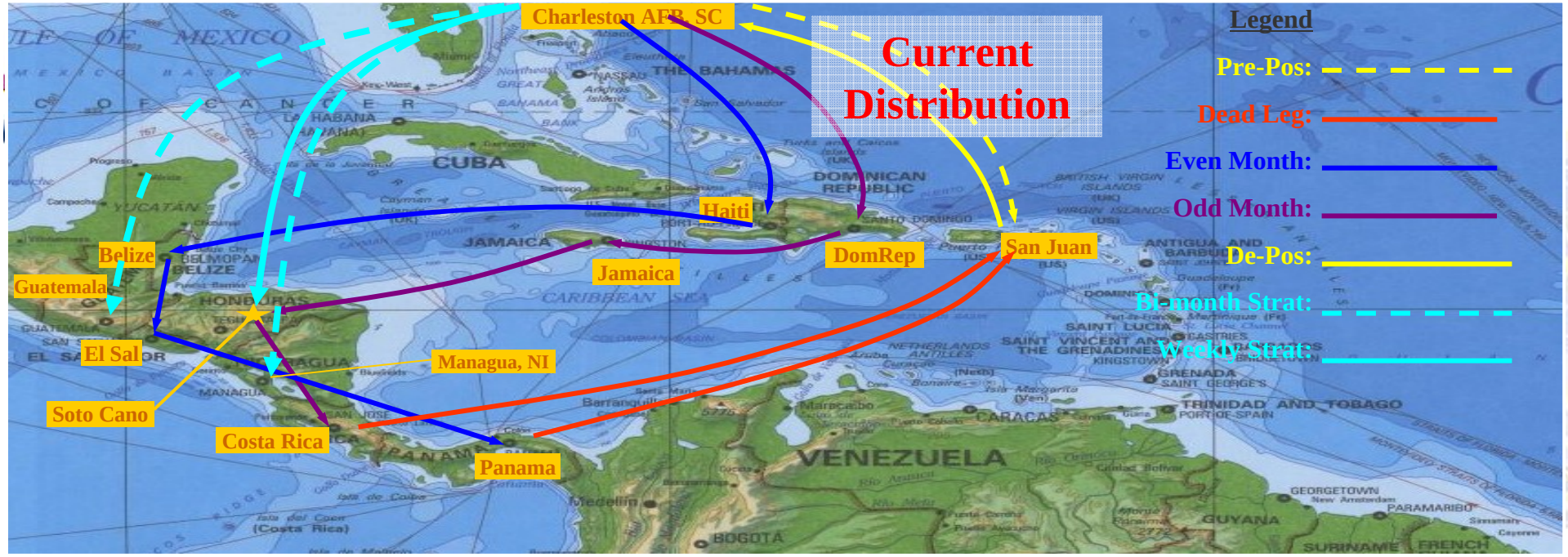
- **Commander, USSOUTHCOM ordered the development of a Theater Distribution Plan for the SOUTHCOM AOR**
- **A phased approach was instituted to address the 4 regions in order**
  - Central America
  - Caribbean
  - Andean Ridge
  - Southern Cone

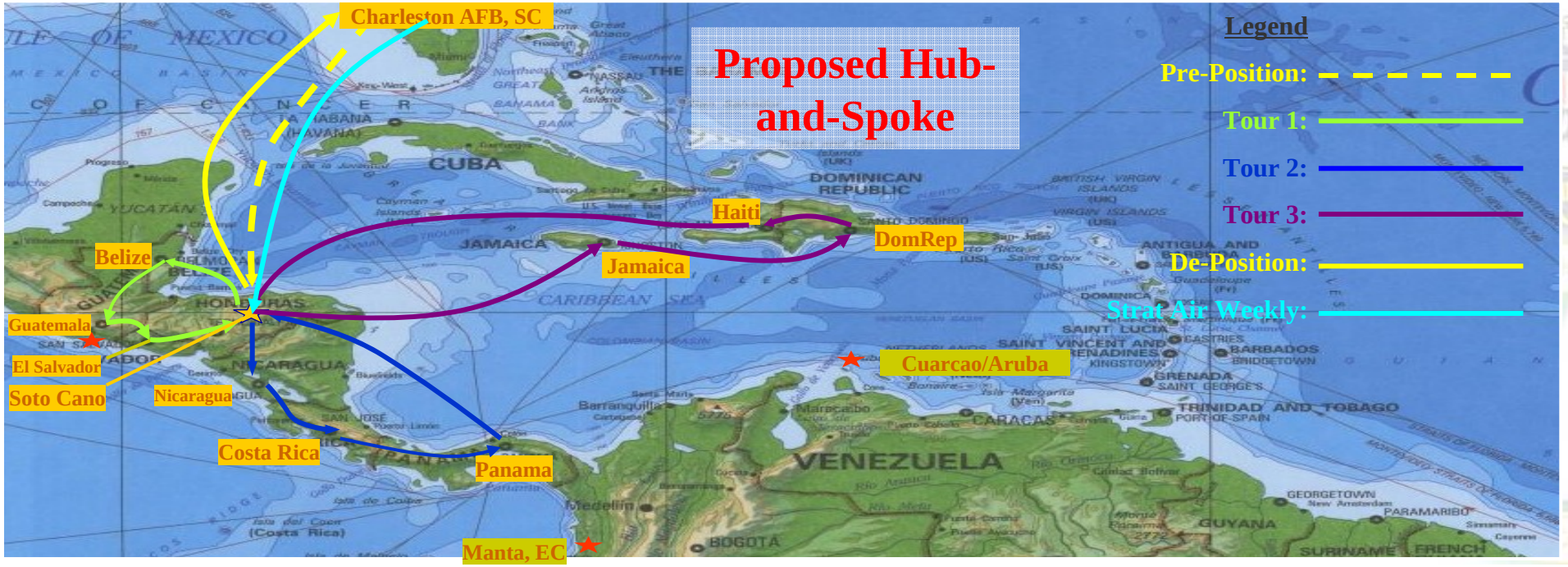
Original Study Purpose

TRANSCOM was originally asked to analyze the benefits of relocation of the Coronet Oak bed down location from Muniz ANGB, Puerto Rico to Soto Cano AB, Honduras, and the overall theater distribution plan for SOUTHCOM

- Comparisons of current operations and proposed operations out of Soto Cano are examined
- Analysis of Air/Sea mixes for deliveries to the Coronet Oak PODs
- Distribution options for 3 Forward Operating Locations (FOLs)
- Analysis of sea delivery to South American PODs

CONOPS Comparisons





Delivery to Central American & Caribbean APODs
CONOPS Comparison Results (2-Month Totals)

Current Method CONOPS

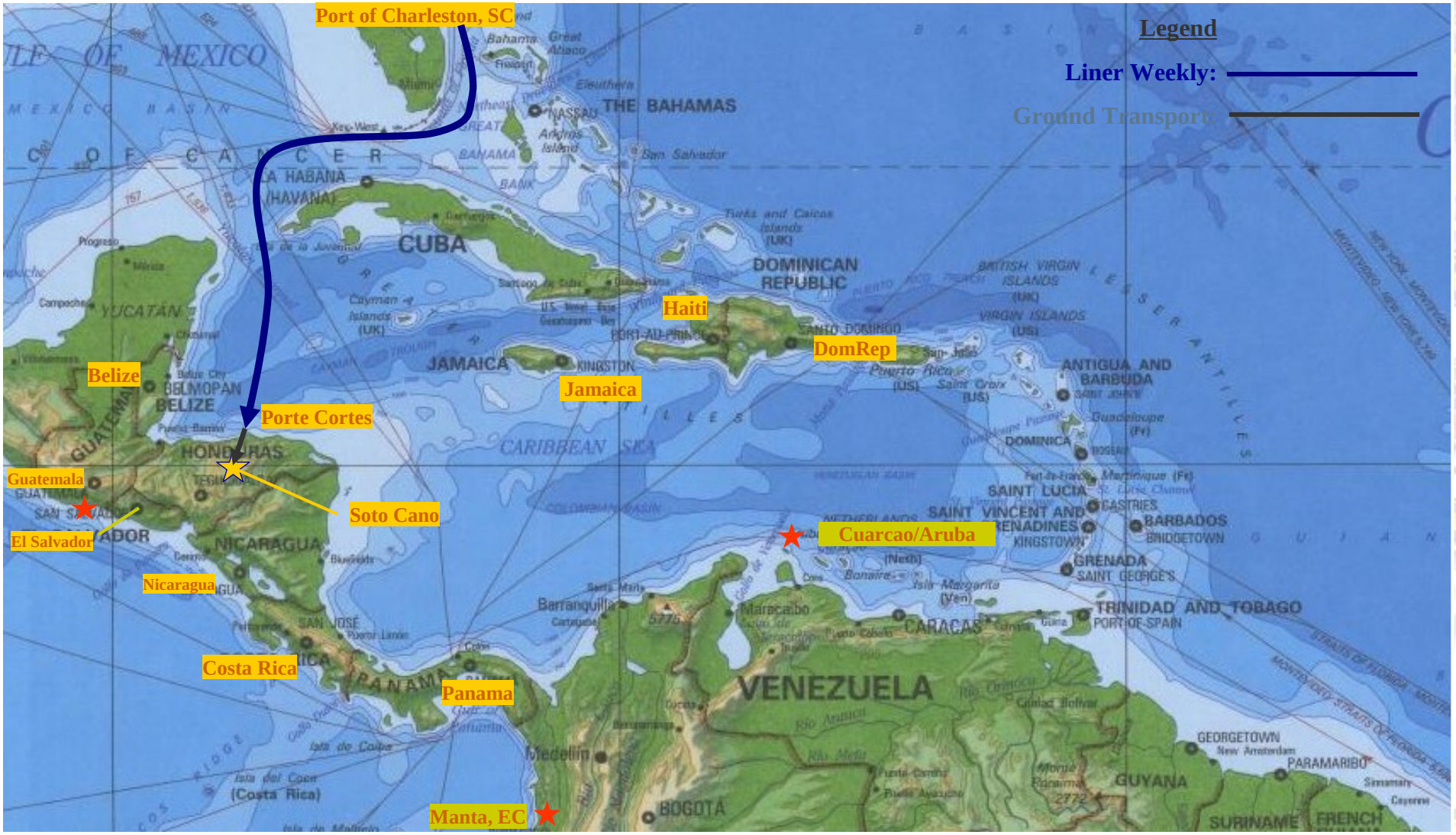
- Total Estimated Cost
  - $1,534,094
- Total Mileage Flown
  - 53,864 NM
- Total Dead Leg Mileage
  - 20,551 NM
- Total Flight Hours
  - 216.7
- Total Coronet Oak Flight Hours
  - 32.4
- Total Dead Leg hours
  - 90.9
- Total Tons Delivered
  - 235 STONS

Hub-and-Spoke CONOPS

- Total Estimated Cost
  - $1,728,146
- Total Mileage Flown
  - 55,360 NM
- Total Dead Leg Mileage
  - 22,170 NM
- Total Flight Hours
  - 212.2
- Total Coronet Oak Flight Hours
  - 42.6
- Total Dead Leg hours
  - 94.2
- Total Tons Delivered
  - 235 STONS

Double the frequency of delivery for similar cost

Liner Service via Porte Cortes



Strategic Air vs. Liner Service Delivery to Soto Cano (2-Month Totals)

Strategic Air

- Total Estimated Cost $1,728,146
  - Estimated Cost of Delivery to SCAB only: $1,074,393
  - Estimated Cost of Coronet Oak Hub-and-Spoke missions: $653,753
- Total Tons Delivered
  - 235 STONS
- Aircraft Repositioning Costs borne by AMC

Liner Service

- Total Estimated Cost $714,350
  - Estimated Cost of Delivery to SCAB only: $60,597
  - Estimated Cost of Coronet Oak Hub-and-Spoke missions: $653,753
- Total Tons Delivered
  - 235 STONS
- Ship Repositioning Costs borne by carrier

By combining the hub-and-spoke with liner delivery to Honduras, save ~ $500K per month

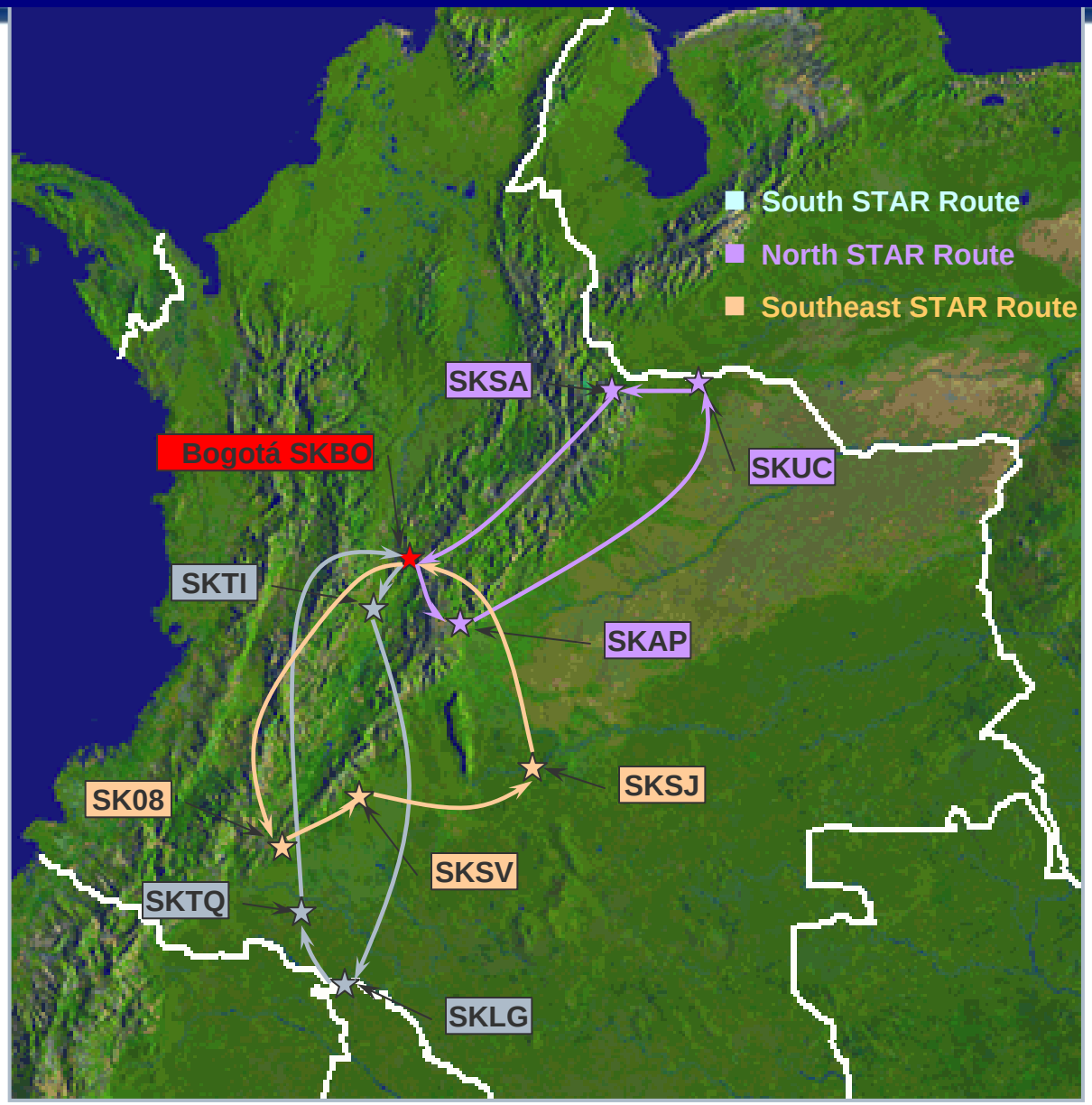
Follow-on Study Purpose

USSOUTHCOM continued to try to streamline and improve delivery of routine cargo to its AOR

The focus moved to the delivery of cargo and personnel to locations in Colombia

- All cargo goes through Bogotá (60,000 lbs/month, 40,000 lbs/month moves from Bogotá to other Colombian destinations)
- Some operational deliveries are made by STAR routes to larger locations, potentially by C-130 channel missions
- Some smaller locations can only be serviced by CASA-212 or other small aircraft

Colombian STAR Routes



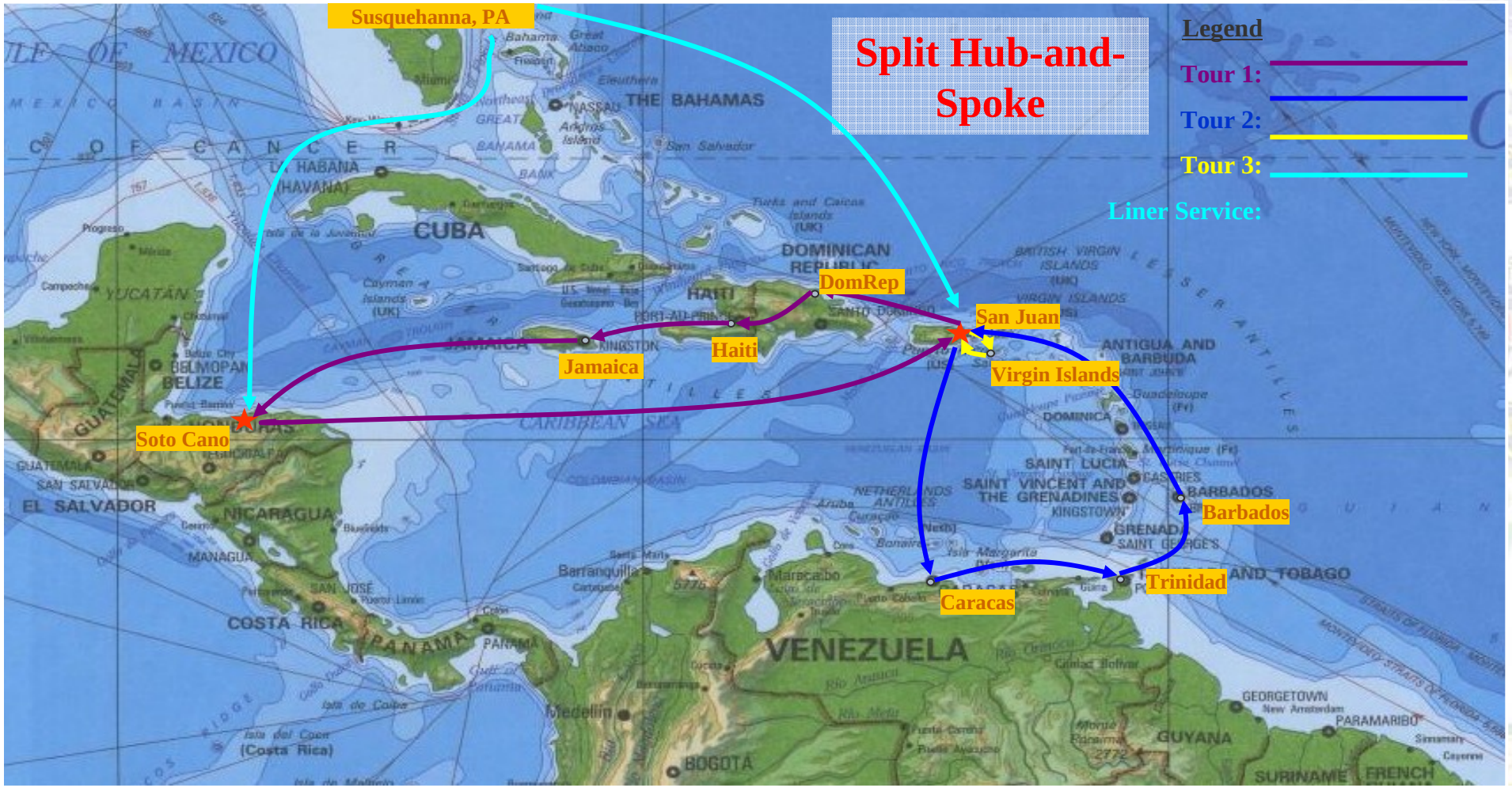
STAR Deliveries

Operational Delivery to STAR hubs

- Case 1 is CASA-212 delivery to STAR hubs
  - Cost is $55,436, total CASA hours 87.3 (35.9 nonproductive)
- Case 2 is C-130 delivery to STAR hubs
  - Cost is $147,005, no CASA hours
- Case 3 is same as case 2 but with road deliveries to Apiay and Tolemaida
  - Cost is $92,039, no CASA hours

Secondary Distribution Hub

Consider the benefits and drawbacks of a secondary distribution hub located in Puerto Rico (Muniz ANGB)



Caribbean Delivery

Strat Air Delivery

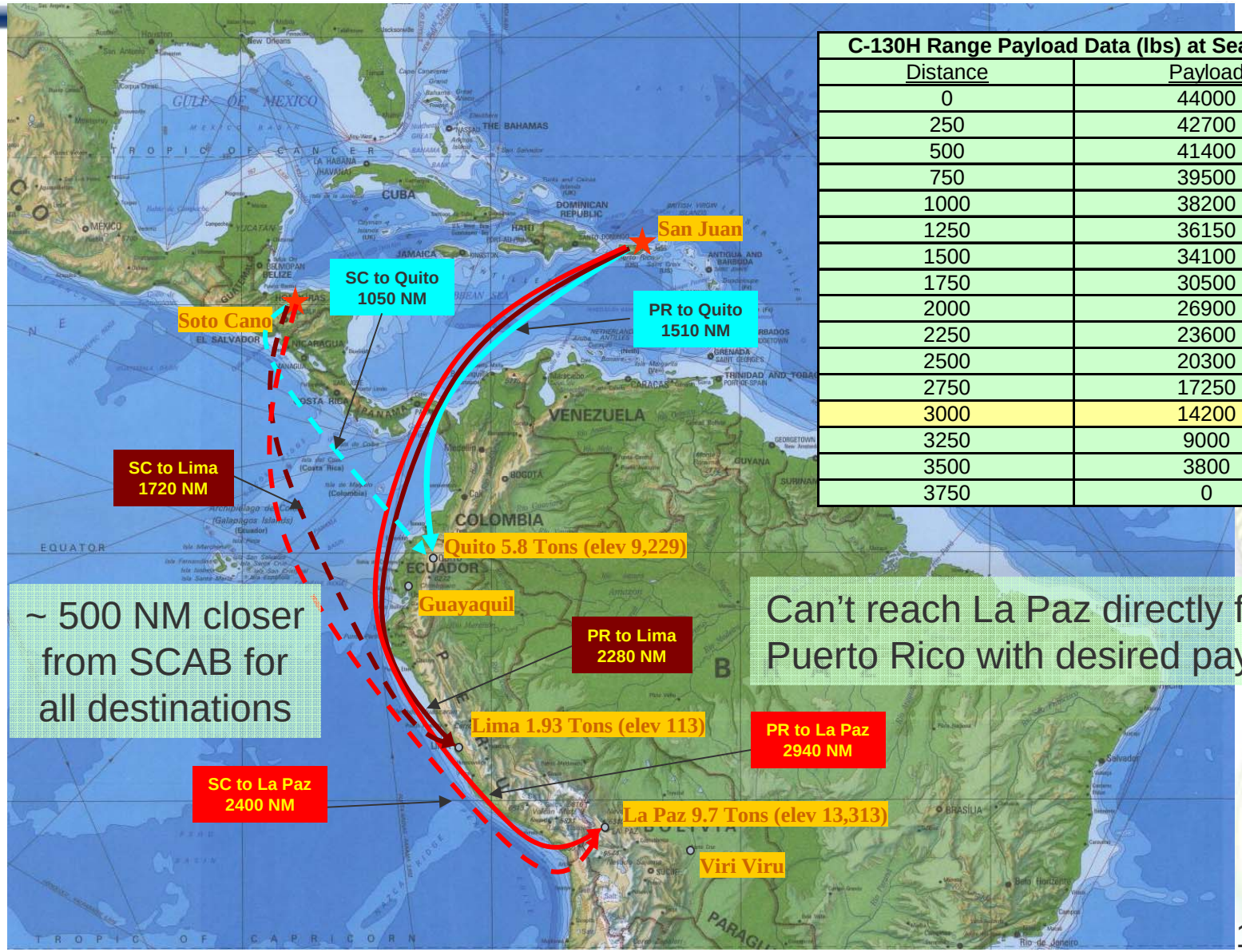
- **~ $46,000** every 2 months
- Comes direct from CONUS
  - Only handled once
- Lower costs due to small delivery sizes
  - Paying by the pound

Coronet Oak Delivery

- **~ $67,800** every 2 months
- Includes surface delivery to PR
  - Extra handling
- Higher costs for sending entire plane for small loads
  - Paying by the hour

Strat air delivery costs less and is simpler

Soto Cano Services West Coast Better



C-130H Range Payload Data (lbs) at Sea Level	
Distance	Payload
0	44000
250	42700
500	41400
750	39500
1000	38200
1250	36150
1500	34100
1750	30500
2000	26900
2250	23600
2500	20300
2750	17250
3000	14200
3250	9000
3500	3800
3750	0

Observations and Recommendations

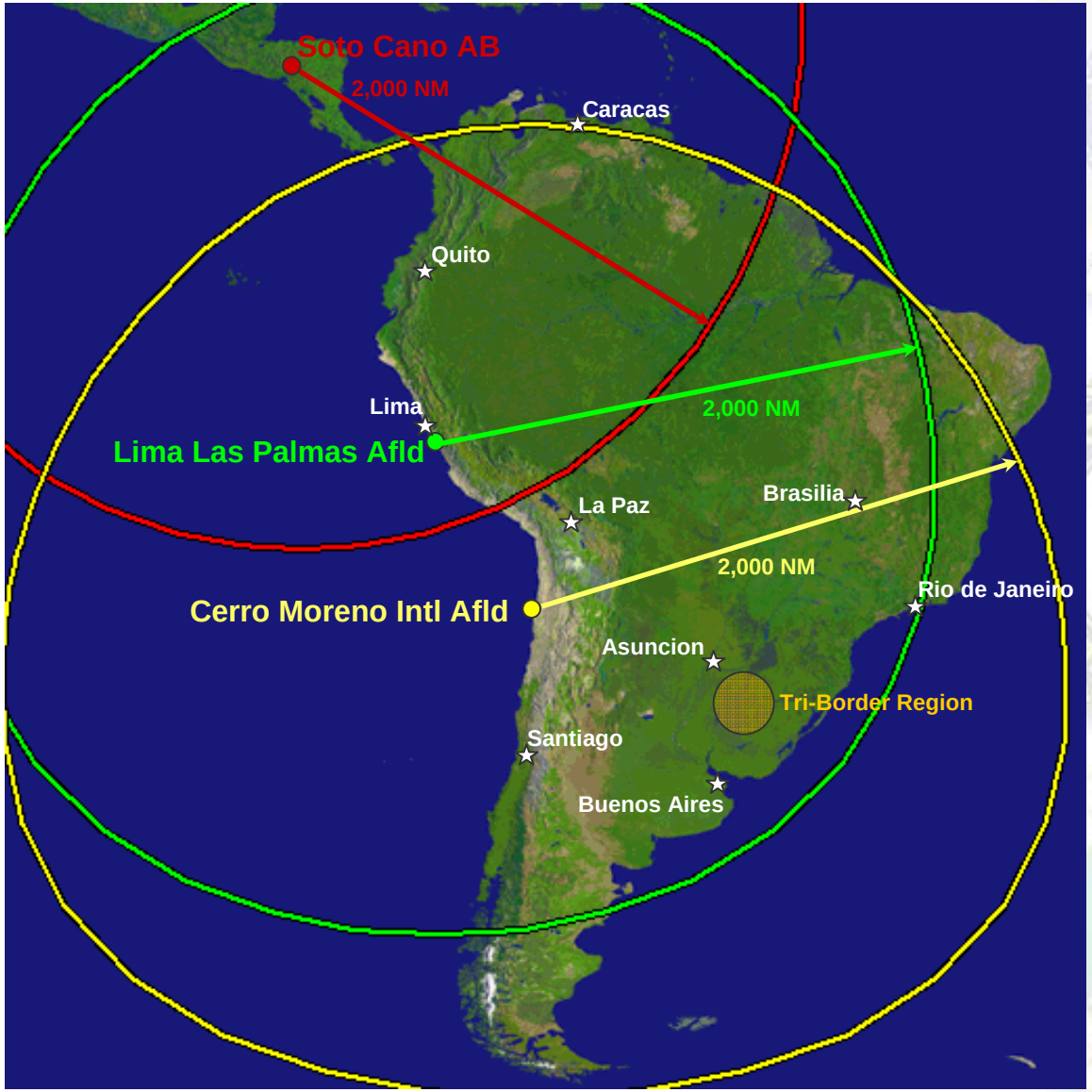
There is no compelling economic benefit to establishing a hub in Puerto Rico

- Small loads to Caribbean make strategic air delivery more attractive
  - Commercial delivery to these destinations might be best option
- Longer distance to west coast of South America make Soto Cano better hub due to overflight issues
  - Cannot reach La Paz directly from PR (range-payload)
  - Can get to La Paz from PR if you go to Lima first
- Strat air slightly more costly than hub from Soto Cano, but simpler and removes payload-range issues

C-130 2000 NM Ring from Airfields

USTRANSCOM analysts proposed that a secondary hub located on the west coast of South America would likely provide benefits

C-130H Range Payload Data (lbs) at Sea Level	
Distance	Payload
0	44000
250	42700
500	41400
750	39500
1000	38200
1250	36150
1500	34100
1750	30500
2000	26900
2250	23600
2500	20300
2750	17250
3000	14200
3250	9000
3500	3800
3750	0



South American Delivery via Chile

Legend

- Tour 1:
- Tour 2:
- Tour 3:
- Tour 4:
- Liner Service:

South American Delivery via Chile

Strat Air Delivery

- **~ $285,400** every 2 months
- Comes direct from CONUS to final destination
  - Only handled once
- Paying by the pound
- Repositioning costs paid by AMC

Coronet Oak Delivery

- **~ $198,600** every 2 months
- Includes surface delivery to theater hub
  - Extra handling
- **Lower dead leg mileage than Peru** option (excluding positioning and depositioning)
- **Positioning and depositioning** costs for Coronet Oak **included** (**~30% of total costs**)

Savings of approximately $80K every two months

Conclusions

Establishment of a theater distribution hub along the west coast of South America has the potential to save ~500K per year, perhaps more

- Either modeled location provides cost benefits
- Analysis not locked to these locations, similar locations along the coast provide similar benefits
- Lower dead leg and lower cost of distribution from Chile, but higher positioning and depositioning costs

Additionally, such a hub provides reach to nearly the entire continent by C-130

Current Channel Commercialization Study

Problem Statement: Identify the best multi-modal COA for current Channel cargo distribution to USSOUTHCOM Customers

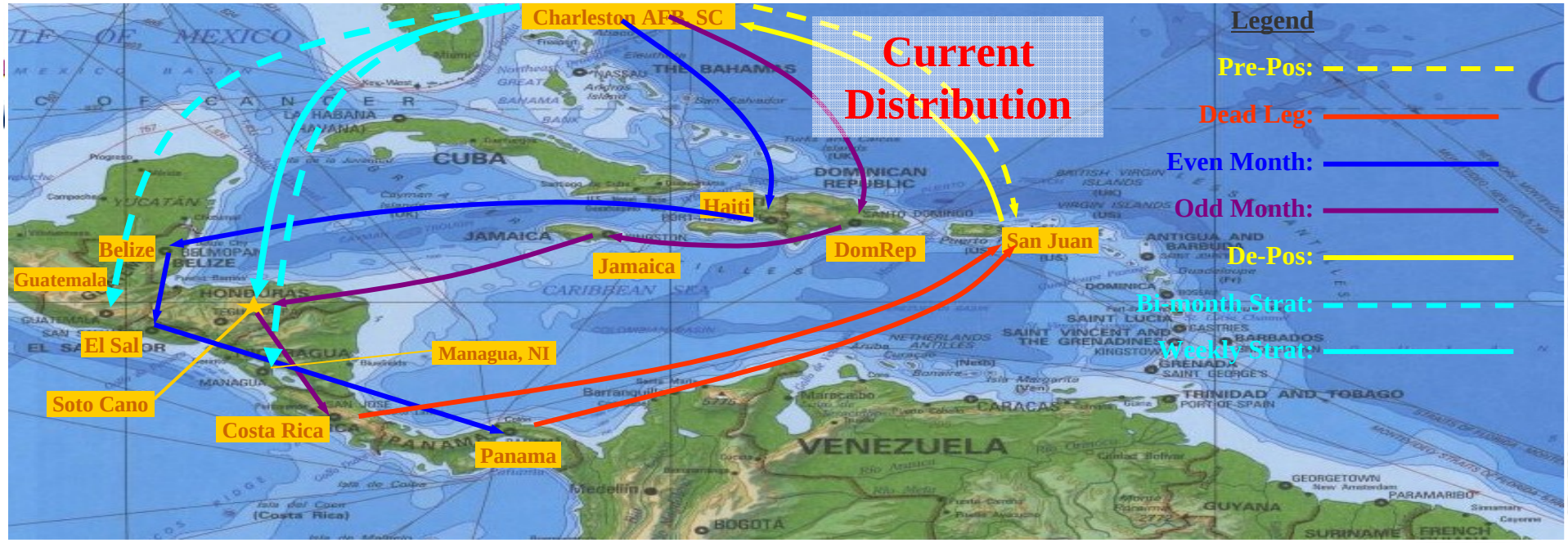
Evaluation Criteria

- **End-to-End Transportation Costs**
- **Assessorial Charges**
- **Reliability of Service**
- **Sensitivity to Priority**

Methodology

- **Analyze Demand**
  - **By Region** **By Commodity**
  - **By Weight** **By Dimensions**
  - **By Priority** **By Special Handling Requirements**
- **Bound the Solution Set**
  - **Lowest Cost for Current EOM Service**
  - **Lowest Cost for Desired Monthly Service**

Backups



- Over the 2 month example period, 16 C-130 aircraft rotate into and out of the AOR
- For simplicity, all aircraft are assumed to begin at Charleston AFB
- 14 aircraft position directly to Puerto Rico
- Once in the example period 1 C-130 performs a loop starting at Charleston and ending at Puerto Rico servicing Haiti, Belize, El Salvador, and Panama along the route
- Once in the example period 1 C-130 performs a loop starting at Charleston and ending at Puerto Rico servicing the Dominican Republic, Jamaica, Honduras, and Costa Rica along the route
- The large requirement to Soto Cano is delivered by weekly channel service
- Guatemala and Nicaragua are serviced by channel missions every other month

Hub-and-Spoke CONOPS

- Over the 2 month example period, 16 C-130 aircraft rotate into and out of the AOR
- For simplicity, all aircraft are assumed to begin at Charleston AFB
- All 16 aircraft position directly to Soto Cano
- Twice in the example period 1 C-130 performs a loop starting and ending at Soto Cano servicing Belize, Guatemala, and El Salvador
- Twice in the example period 1 C-130 performs a loop starting and ending at Soto Cano servicing Nicaragua, Costa Rica, and Panama
- Twice in the example period 1 C-130 performs a loop starting and ending at Soto Cano servicing Jamaica, the Dominican Republic, and Haiti
- The large requirement to Soto Cano is delivered by weekly channel service

Delivery to Central American & Caribbean APODs
Comparison of CONOPS

Current CONOPS

- Beddown in Puerto Rico
- Weekly service to Soto Cano
- Two Coronet Oak delivery tours
- Once every other month service to all other APODs
- Two strategic air deliveries in addition to Soto Cano (Nicaragua and Guatemala)

Hub-and-Spoke CONOPS

- Beddown at Soto Cano
- Weekly service to Soto Cano
- Three Coronet Oak delivery tours
- Once every month service to all other APODs
- No strategic air deliveries except Soto Cano

Delivery to Central American & Caribbean APODs CONOPS Comparison Results

Hub-and-Spoke CONOPS doubles the frequency of delivery to theater APODs for about 12% higher cost (same total cargo)

Some costs to SOUTHCOM might be still lower for the Hub-and-Spoke CONOPS since the cargo is flown to SCAB at channel rates then on to final destination at hourly rates

- Probably true cost to SOUTHCOM would not "double count" some of these costs

Hub-and-Spoke CONOPS requires an additional 10.2 Coronet Oak flying hours over a 2 month period

- 3% increase in average monthly Coronet Oak flying hours

Bottom Line: Double the frequency of delivery for small increase in costs

Small Location Delivery

Tactical Delivery to Smaller Locations

- SKBU, SKFL, La Macarena

- Case 1 is CASA-212 delivery from Bogotá
  - Total cost is $14,224, total CASA hours are 22.4 (11.2 nonproductive)
    - 3 x SKBO – La Macarena
    - 3 x SKBO – SKBU
    - 2 x SKBO – SKFL
- Case 2 is CASA-212 delivery from nearest STAR hub
  - Total cost is $40,332, total CASA hours are 9.7 (6.3 nonproductive)
    - 2 x SKAP – La Macarena
    - 2 x SKTI – SKBU
    - 1 x SK08 – SKFL
  - Total cost is higher than Case 1 because C-130 channel missions must move cargo to the STAR hubs (charged at $2.96/lb)
  - Total cost includes positioning and depositioning of the CASAs to/from Bogotá
  - Total cost is reduced to $14,522 if road deliveries are made to Apiay and Tolemaida and CASA hours remain the same

Summary Comparisons

Total Cost and CASA hours for different options

- Strat Air + CASA STAR deliveries + CASA to smaller locations from STAR hubs
  - Cost = $232,800 CASA Hours = 97 (SKBQ requirement not moved past Bogotá)
- Strat Sea + C-130 STAR deliveries + CASA to smaller locations from STAR hubs (no road to SKTI or SKAP)
  - Cost = $213,550 CASA Hours = 9.7
- Strat Sea + C-130 STAR deliveries + CASA to smaller locations from STAR hubs (with road to SKTI and SKAP)
  - Cost = $132,775 CASA Hours = 9.7
- Strat Sea + CASA STAR deliveries + CASA to smaller locations from STAR hubs (no road to SKTI or SKAP)
  - Cost = $121,980 CASA Hours = 97